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**Editor - Captain L. B. Marshall, MC, USN (RET)**

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Graduate Training in Navy Hospitals

Applications for assignment to residency training duty are desired from Regular medical officers and those Reserve medical officers who have completed their obligated service under the Universal Military Training and Service Act, as amended. The following chart lists those Navy hospitals which currently have vacancies at the first year level, and the specialties in which these vacancies exist. Vacancies are also available at other than first year levels. Information concerning non-first year appointments may be obtained by correspondence addressed to the Chief of the Bureau of Medicine and Surgery.

	Bethesda, Md.	Chelsea, Mass.	Oakland, Calif.	Philadelphia, Pa.	Portsmouth, Va.	San Diego, Calif.	St. Albans, N. Y.
Anesthesia	x	x	x				
General Practice		x			x		
Internal Medicine		x		x	x	x	x
Neurology	x			x			
Orthopedics	x	x					
Otolaryngology			x	x			
Pathology	x		x	x		x	
Pediatrics			x				
Psychiatry	x		x	x			
Radiology	x	x	x			x	
Surgery ***					x	x	x
Urology							x
Cardio-Vascular Diseases	x						

\*\*\* Residency training in General Surgery is currently open to Regular officers only.

Letters of application for first year assignments should be forwarded via official channels to the Chief of the Bureau of Medicine and Surgery, and should include an obligated service agreement prepared in accordance with the provisions of BuMed Instruction 1520.7

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SPECIAL NOTICE

TO ALL ADDRESSEES (EXCEPT U. S. Navy and Naval Reserve personnel on ACTIVE DUTY and U. S. Navy Ships and Stations).

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Failure to reply to the address given on the form by 15 December 1955 will automatically cause your name to be removed from the files. Only one (1) answer is necessary. Please state the branch of the Armed Forces (if any) and whether Regular, Reserve, or Retired. Also, please write legibly. If names and addresses cannot be deciphered, it is impossible to compare them with the addressograph plates.

Editor

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(Detach here)

Chief, Bureau of Medicine and Surgery  
 Navy Department, Potomac Annex  
 Washington 25, D. C.

\_\_\_\_\_ (date)

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### Policy

The U.S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be nor susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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### Notice

Due to the critical shortage of medical officers, the Chief, Bureau of Medicine and Surgery, has recommended, and the Chief of Naval Personnel has concurred, that Reserve medical officers now on active duty who desire to submit requests for extension of their active duty for a period of three months or more will be given favorable consideration.

\* \* \* \* \*

### Current Concepts of Pulmonary Edema

Pulmonary edema may be defined as the transudation of plasma into the alveoli and its extension by air currents into the passages of the respiratory tract.

The basic factors that are involved in pulmonary edema, as they affect the pulmonary capillary, are: (1) hydrostatic pressure, (2) intrathoracic pressure, (3) protein osmotic pressure, (4) capillary permeability, and (5) lymphatic "run off." The clinical picture of pulmonary edema has been well described and need not be discussed at this time.

Pulmonary edema, when not adequately treated, kills because of uncorrected anoxic anoxia and hypercapnia. Every effort toward the prevention of pulmonary edema should be made. The patient who seems likely to go into pulmonary edema should be affected favorably by rest, digitalis, diuretics, salt balance, water regulation, and sedation.

Granted that a patient is properly prepared and must undergo surgery, it is wise to add the antibiotic preoperatively. During surgery, every effort must be made to maintain a clear airway. An obstructed airway will augment the negative intrathoracic pressure and result in pulmonary edema. Blood loss must be accurately replaced so that over-transfusion with rapid

hypervolemia does not result. The use of weighing scales in the operating rooms to determine blood loss is a useful adjunct to prevent overtransfusion. Saline and other fluids should be administered with caution during operation and in the postoperative period. It is best to be on the safe side and administer less than the so-called required amount of fluids to the patient who seems a likely candidate for pulmonary edema. Constant attention to bronchial toiletry is also important. These patients should be encouraged to cough and move about in the postoperative period. Prevention of abdominal distention will aid in the prevention of pulmonary edema by allowing for greater ventilatory movements of the diaphragm and mitigating abnormalities in the abdomino-thoracic venous pressure gradient.

Once pulmonary edema is present, immediate treatment should be instituted. Oxygen should be administered because it serves the obvious purpose of facilitating correction of the generalized anoxia that results from pulmonary edema. The authors have been particularly impressed with the use of oxygen given under positive pressure breathing with a Bennett valve. Intermittent positive-pressure breathing tends to diminish the volume of blood entering the right heart and, therefore, the lungs. It also tends to widen the bronchial pathways. Recently, Luisada has added alcohol vapor to the intermittent positive-pressure breathing and has found it beneficial because of its antifoaming action.

Morphine alone will alleviate a large number of attacks. It can be administered intravenously. Caution is advised in the elderly patient and in those with pulmonary emphysema. Morphine acts by alleviating the labored breathing and concomitant decrease in intrathoracic pressure which tends to increase pulmonary edema.

Digitalization is obvious. The rapid acting glycosides are most frequently used.

From a clinical standpoint, bloodless phlebotomy (tourniquets) and phlebotomy are the most direct means of producing a decrease of the inflow load in the right heart. These measures will allow for an increase in vital capacity and occasionally lead to an increase in the arterial blood saturation. The cerebrospinal fluid pressure falls after venesection, a factor that may tend to relieve dyspnea. However, it should be borne in mind that all these favorable actions must be balanced against the possibility that shock may be precipitated by venesection with a resultant lowering of cardiac output.

Aminophylline, given intravenously or by suppository, has definite clinical value. The drug is apparently a powerful relaxant of smooth muscle, and, therefore, the element of bronchospasm is relieved.

Treatment of pulmonary edema associated with chronic congestive heart failure is the treatment of the latter disease. At this time, a discussion of such treatment is not necessary.

Strong mention should be made of two very useful procedures: atropinization and tracheotomy. Because it has been shown that the parasympathetic



pathways are involved in pulmonary edema of neurogenic origin (brain trauma, et cetera), it became obvious that atropine administration might be of benefit.

In the unconscious and semicomatose patient or the patient with extensive fluid in the bronchial tree, one of the finest adjuncts in the treatment is tracheotomy. The authors found it to be so effective that, when tracheotomy is considered, their policy has been that it should be done immediately. Tracheotomy accomplishes many things in these patients. It by-passes the vocal cords which may be paralyzed and add to intrathoracic pressure. It decreases the respiratory dead space of the mouth and pharynx. It allows for a direct passageway into the bronchial tree so that fluid can be suctioned out by a physician or a nurse. It allows for positive-pressure breathing, if necessary.

The authors' opinion is that, in severe instances of acute pulmonary edema, tracheotomy will achieve a much wider range of usefulness in the future than it has in the past. (LCDR I. D. Baronofsky (MC), LT J. W. Cox (MC) USNR, Some Current Concepts of Pulmonary Edema: Arch Int. Med., 96: 375-379, September 1955)

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#### Use of Pentaerythritol Tetranitrate

The therapy of chronic coronary insufficiency is primarily concerned with the establishment of compensation in the coronary circulation. The treatment must be individualized and must consider all factors involved in the development of the disease and its resulting symptoms. In some instances, the correction of underlying secondary factors (anemia, cardiac decompensation, obesity, and the like) may completely eradicate the symptoms characterized largely by the syndrome of angina pectoris or its equivalent. In others, in spite of all the physical and pharmacologic agents used, the authors found that many patients continued to be disabled in varying degree.

The lack of adequate treatment for this latter group prompted the authors to consider a drug which might be of therapeutic value. Pentaerythritol tetranitrate (Peritrate) appeared to be a possible answer to this problem, and with this purpose in mind the present study was undertaken.

Forty-two patients were originally studied. Twenty patients continued in the study for approximately 6 months. These patients had an average of 60.2 years, ranging from 48 to 75. All patients had clinically obvious angina pectoris for which all had previously sought medical attention. All patients, despite varying frequency or intensity of their pain, got immediate and complete relief from nitroglycerine taken sublingually although some complained bitterly of the side-effects, especially headache.



The patients were studied for 935 days on pentaerythritol tetranitrate and 595 days on placebo. The duration of an individual study ranged from 30 to 182 days.

Prior to subjecting results of the study to analysis, the authors had an over-all impression that the majority of their patients were benefited considerably by pentaerythritol tetranitrate. The enthusiastic comments of the patients about the added comfort, increased relief from pain, and relative elimination in the frequency and quantitative need for nitroglycerine prompted this opinion.

From this study, the authors concluded that pentaerythritol tetranitrate was of decided value in the treatment of 25% of patients with chronic coronary insufficiency. Except for the findings of Riseman, the results are significantly different from those previously reported. However, because of the difficulty in managing this disease adequately with the therapies now available, the authors believe that this drug should be considered seriously as a positive addition to the pharmacologic treatment of angina pectoris. They are of the opinion that in some patients with this illness pentaerythritol tetranitrate may mean the difference between complete - or almost complete - absence of symptoms, or a prolonged illness with much suffering. (Rosenberg, H. N., Michelson, A. L., The Use of Pentaerythritol Tetranitrate in Chronic Coronary Insufficiency: *Am. J. Med. Sc.*, 230: 254-257, September 1955)

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#### Pleuropulmonary Tularemia

Due to the great advances made in chemotherapy in the last decade, specific treatment of certain types of pneumonia is now possible. Because of this, the roentgen differentiation as to etiology is becoming increasingly important. This report is based on the roentgen study of 16 patients with pleuropulmonary tularemia. An attempt was made to determine if there was any characteristic feature in the conventional anteroposterior chest roentgenogram which would lead one to suspect the nature of the pneumonia.

The disease is usually divided into three clinical forms: ulceroglandular, oculoglandular, and typhoidal types. Pneumonia may occur in any form. The portal of entry into the lungs is not always clear. In this series, 8 cases fell into the typhoidal types, and 8 cases were of pneumonia secondary to ulceroglandular tularemia. The fact that a large number of patients with tularemic pneumonia have no primary tularemic ulcer of the skin or mucous membrane, and that early clinical diagnosis of tularemic pneumonia is frequently difficult makes it very desirable to find some characteristic roentgen finding which would lead the physician to suspect P. tularensis as the etiological agent of the pneumonia. The clinician can then carry out

other tests which will prove the diagnosis. This is particularly important because the mortality rate of untreated tularemic pneumonia is high and treatment by streptomycin is usually curative.

In the present series, the records of 34 patients with tularemia, treated at the Veterans Hospital, were reviewed. Eleven (31%) of these had definite pulmonary involvement and were classified as pleuropulmonary tularemia. The diagnosis was based on a rising serum agglutinin titer against P tularensis. Serial 14- by 17-inch chest roentgenograms were made on each patient. The study of these, plus 5 cases of pleuropulmonary tularemia treated at Vanderbilt University Hospital, comprises the basis of this report.

Notably, in 9 of the 16 cases, there was an oval area of infiltration seen on the first chest roentgenogram. This varied in size and location. Its peculiar round appearance was similar to that of an abscess before the occurrence of cavitation. In one case, it resembled a large metastatic nodule. In another, it was masked by pleural effusion but could be seen following the removal of the fluid. This was the most constant and notable finding. In one case, a patchy area of density scattered throughout the left upper lobe was present. This was indistinguishable from pulmonary tuberculosis. In only 5 cases, was hilar adenopathy a significant finding. In one of these cases, the diagnosis was suggested by one of the roentgenologists in the hospital from the chest roentgenogram alone. In 10 cases, the pleura was involved and manifested by varying degrees of pleural effusion. In some instances, fluid was not seen in the pleural cavity on the first examination, but as the disease progressed pleural effusion became manifest.

Although there was no one single sign that could be attributed to tularemia alone, it is believed that the common occurrence of an oval area of infiltration, not usually seen in other pneumonias, is a noteworthy finding. This seems to fit the known pathological findings of a confluent lobular pneumonia with an appearance similar to that of caseous tuberculous pneumonia. This finding alone or in the presence of enlarged hilar lymph nodes should certainly lead one to consider the possibility of tularemia as the etiology of the pneumonia, although it is not pathognomonic of tularemia alone. In most cases, the presence of pleural fluid seemed to occur in relation to the length of the disease. It is believed that the presence or absence of pleural fluid will be of no special benefit in the differential diagnosis. (Ivie, J. McK., Roentgenological Observations on Pleuro-Pulmonary Tularemia: Am. J. Roentgenol., 74: 466-471, September 1955)

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The printing of this publication has been approved by the Director of the Bureau of the Budget, 16 May 1955.



### Spontaneous Hypoglycemia

That periodic spontaneous hypoglycemia is the cause of significant and sometimes alarming symptoms in a relatively large number of patients, has become apparent to most physicians.

This presentation has four major purposes: (1) to outline again the whole problem, incorporating recent additions to present knowledge and rejecting discredited concepts; (2) to demonstrate the clinical usefulness of a few simple, but rigid, criteria in establishing the specific etiologic diagnosis in more commonly encountered and confusing types of spontaneous hypoglycemia; (3) to discuss rational therapy for the various types, based upon present concepts of the abnormal mechanism which produces hypoglycemia in each instance; and (4) to attempt to prevent unnecessary pancreatic explorations and subtotal pancreatectomies in patients who exhibit no indication for such procedures.

Spontaneous hypoglycemia is not a disease. It is an indication of a derangement in the over-all utilization of carbohydrate in which glucose has been removed from the blood at a rate faster than it has been replenished, with a resultant depression of the blood sugar to an abnormally low level. As indicated in this report, many organic and functional lesions exist, any one of which is capable of increasing the rate of removal of glucose from the blood and/or of decreasing its rate of entry into the blood. Recognition of this fact constitutes the first step toward an intelligent appraisal of the mechanism by which hypoglycemic episodes are produced in any given patient.

By definition, the term excludes hypoglycemia induced by the administration of exogenous insulin, but in the evaluation of the patient suffering from spontaneous hypoglycemia, the possibility of a factitious cause (self-administration of insulin) must always be in mind. Also, by definition, the term excludes the concept of "relative hypoglycemia" which has crept into the literature to cause confusion in both diagnosis and management.

Spontaneous hypoglycemia and hyperinsulinism are not synonymous terms. The former is the generic term. It includes all clinical situations in which the blood sugar may fall to abnormally low levels spontaneously. The term hyperinsulinism is confined to those types of spontaneous hypoglycemia in which an absolute increase in the production of endogenous insulin is believed to occur.

Unusual manifestations of hypoglycemia, as well as their relation to the actual level of the blood sugar, have often caused confusion in diagnosis. At opposite poles of the spectrum of symptoms, are two distinct clinical pictures. The appearance of one pattern or the other, or of a combination of the two, is determined, not only by the level of the blood sugar but also by the rate at which it has fallen and the duration of the hypoglycemia. If the rate of fall in blood sugar is rapid, the predominant, early symptoms



are those produced by compensatory hyperepinephrinemia. This mechanism represents an attempt to restore normal blood glucose levels by accelerating hepatic glycogenolysis. The symptoms are those which are observed during a mild reaction after administration of too much soluble insulin, and consist of sweating, weakness, hunger, tachycardia, and "inward trembling." Conversely, if the blood sugar falls slowly to low levels over a period of many hours, the manifestations are cerebral in type: headache, visual disturbances, mental confusion, coma, and convulsions. If the decrease in blood glucose is rapid, profound, and persistent, the initial symptoms due to excessive circulating epinephrine merge with those of cerebral hypoglycemia.

When the blood sugar concentration remains low for most of the 24-hour period, a situation which may occur in organic hyperinsulinism, the manifestations of hypoglycemia may be so bizarre as to be completely misleading. Any aspect of the entire range of neurologic or psychiatric disorders may be mimicked, including sensory or motor loss of an extremity, hemiplegia, outbursts of temper, extreme depression, or apparent catatonic schizophrenia. Despite the atypical nature of symptomatology in some individuals, it is of interest that the same complex of symptoms tends to recur in the same patient. In the authors' experience, periodicity of symptomatology represents a more important diagnostic hint of underlying hypoglycemia than the specific type of complaint which is offered. The repetitive nature of the complaint, occurring at fairly specific times during the 24-hour period, should arouse suspicion. The demonstration of hypoglycemia during an attack, together with dramatic relief of symptoms with intravenously administered glucose, establishes only the nonspecific diagnosis of spontaneous hypoglycemia. The specific etiologic diagnosis must be established at this time if rational and effective therapy is to be applied.

It is beyond the intent of this presentation to attempt to discuss the body's complex physiologic mechanisms which, when properly integrated, result in normoglycemia. Mention of the more important tissues, organs, and endocrine glands involved is sufficient to impress one with the multiplicity of possible aberrations which can upset the delicately balanced level of blood sugar. The list includes the central nervous system, the autonomic nervous system, the gastrointestinal tract, kidneys, liver, muscles, pancreas, adenohypophysis, adrenal cortex and medulla, and the thyroid.

Some situations are listed which are associated only rarely with hypoglycemia but are included for purposes of more complete classification. The more commonly encountered types are discussed in detail. (Conn, J. W., Seltzer, H. S., Spontaneous Hypoglycemia: *Am. J. Med.*, XIX: 460-475, September 1955)

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### Improved Coal Tar Ointment

A 1% crude coal tar ointment, in which the tar is finely divided and dispersed uniformly by the addition of 0.5% of polyoxyethylene sorbitan monolaurate (Tween 20), a nonionic surfactant, prior to incorporation with zinc oxide paste, has proved to be clinically effective, while producing about one-fourth as many reactions of cutaneous irritation as occurred in the use of 2% and 5% crude coal tar in zinc oxide paste prepared by standard methods.

One percent of crude coal tar and 0.5% of polyoxyethylene sorbitan monolaurate, a hydrophilic surface-active agent, are thoroughly mixed and then incorporated with zinc oxide paste U. S. P. XIV. The resulting ointment is a uniform, smooth preparation of a medium gray color and moderate tar odor. Microscopically, the tar particles are very fine and uniformly dispersed throughout the vehicle. The ointment is easily compounded extemporaneously by the independent pharmacist.

As a convenience in identification, the name "solutar ointment" was applied to this preparation. It is a misnomer because this is not a soluble tar ointment. In practice, the ointments are labeled "1 and 1/2% Solutar in Lassar's Paste," and represent a 1% crude coal tar ointment. The term "solutar" refers specifically to the initial mixture of crude coal tar with polyoxyethylene sorbitan monolaurate.

Throughout the first 14 years of this study, the use of tars was seriously restricted because their irritant properties were so great. Many patients came from distances of 100 to 300 miles and close observation was often impossible. The general policy was to withhold crude coal tar unless there was opportunity to observe the patient for at least a few days. Even so, the 10% incidence of reactions was higher than was expected.

During the last 4 years, the policy has changed completely. The "solutar" ointment is prescribed freely, regardless of the opportunity for observation. A simple warning is given to discontinue the medication should untoward results appear, and this same warning is given with the mercurials, quinolines, and the antibiotics.

Moreover, there has been a change in the type of dermatitis for which the tars are prescribed. In the past, their use was restricted to extremely chronic dermatoses, such as psoriasis, lichen simplex chronicus, and hypertrophic lichen planus. The trend at present is toward the use of crude coal tar on somewhat more acute, active dermatitis. The clinical results of the trend are encouraging, and the trend itself makes the lowered incidence of reactions all the more remarkable.

Carefully controlled, statistically significant studies on the types of reactions encountered have not been carried out. It appears from patch tests and re-exposures that the majority of reactions are irritative, and in the minority, specific contact allergies. The authors' impression is



that the fine dispersion of the tar in the "solutar" formulation has reduced the number of these nonspecific irritative reactions without materially affecting the frequency of hypersensitiveness.

Relatively limited clinical studies on indigent as well as private patients regarding the comparative virtues of the zinc oxide paste and the hydrophilic ointment vehicles for the "solutar" formulation, seem to indicate that the oleaginous paste is the better base. This is perhaps due to better adhesion to the skin, better protection against mechanical and chemical trauma, greater occlusiveness, and the generally dry scaly character of the skin most frequently treated with tars. The hydrophilic base has been definitely preferable only when hairy areas are involved.

In spite of the effectiveness of hydrocortisone ointments with their more pleasing physical attributes, no truly satisfactory substitute for crude coal tar has yet appeared. The need for an effective and relatively safe crude coal tar ointment remains great, and the authors' experience with the so-called "solutar" ointment indicates that this ointment is an important advance in dermatologic therapy. (Carney, R. G., Zopf, L. C., An Improved Coal Tar Ointment Using a Surfactant: Arch. Dermat., 72: 266-269, September 1955)

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### Scleroderma

Scleroderma is an uncommon, though not a rare disease. Most physicians see few cases and, therefore, patients affected with this condition are difficult diagnostic problems. At considerable financial and emotional expense, they migrate from one physician to another seeking a satisfactory explanation for their illness.

Scleroderma is a generalized disease of unknown etiology. The fundamental pathologic change is sclerosis of the connective tissue framework of the skin and other organs. This disease has been classified as a collagen disease along with lupus erythematosus, periarteritis nodosa, rheumatoid arthritis, rheumatic fever, dermatomyositis, and possibly thrombotic thrombocytopenic purpura. The collagen system or connective tissue lesions in these diseases constitute the primary pathologic changes. It is, however, a nonspecific pathologic process and does not separate these disease entities from one another. It may not even indicate a common etiologic denominator.

Scleroderma is more common in women than men (1.5 to 1) in the fourth to the sixth decades, though it may occur at almost any age. The onset of the disease is usually either the gradual onset of Raynaud-like phenomena, usually involving the hands and sometimes the feet, or an acute or subacute illness that may be quite mild, characterized by



arthralgia or arthritis, myalgia, a variable skin eruption, and malaise. The course is extremely variable. The onset may be insidious with many years required for its full development, or the disease may appear and progress to a fatal termination in a few weeks. Constitutional symptoms are variable. Nearly all patients lose weight when the disease is active, and this is not necessarily related to involvement of the gastrointestinal tract. About half the patients notice weakness or increased fatigability and some run a low-grade fever. There is usually muscle atrophy and this is not necessarily correlated with the hide-bound state of the skin. Mild arthritis is present in the majority of patients. This consists mainly of stiffness, joint pain, or swelling. In the early stages, it involves soft tissue and seldom produces x-ray changes.

Scleroderma is difficult to diagnose when it masquerades as a single visceral disease. Its similarity to, and differentiation from, Raynaud's disease and scleroderma adultorum have been mentioned. In the early edematous stages, it may superficially resemble myxedema. However, the characteristic physical and laboratory finding of myxedema are absent.

The most difficult disease to differentiate is dermatomyositis. In dermatomyositis, there is initially a rose-pink erythema and edema of the face, eyelids, and extremities, with progressive pain, weakness, and atrophy of various groups of muscles. In scleroderma, there may be muscle atrophy, and in the early edematous stage of skin changes, the two diseases are quite similar. In this stage, one may not be able to differentiate these diseases by biopsy. In later stages, the fundamental skin change in scleroderma becomes quite characteristic. It should also be noted that there is never pulmonary involvement due to dermatomyositis.

The cause of scleroderma is unknown, although at one time or another most of the endocrine glands have been suspected. More recently, suggestions have been made that the disease is a psychogenic or allergic one.

Over the years, many forms of therapy have been used, including most of the available hormones, vitamins, diets, surgical procedures (sympathectomy) and, more recently, para-aminobenzoic acid. None has been consistently useful in checking the course of scleroderma. ACTH and cortisone may give mild, transient relief in some cases. (Butler, J. J., Scleroderma: GP, XII: 103-107, September 1955)

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### Massive Hemoptysis

Hemoptysis is a symptom frequently encountered in diseases of the cardiac and pulmonary systems. The bleeding may be slight in amount and only stain the sputum or expectorated purulent material. Sudden, severe hemoptysis is probably one of the most alarming things which may happen

to a patient and, occasionally, during a massive hemorrhage, death may result. This article is concerned only with the type of patients who have severe pulmonary bleeding which, if continued, would constitute an immediate threat to life.

In a group of patients under observation, hemoptysis frequently amounted to more than 500 cc. during one episode. In some patients there was no previous history of pulmonary disease and the bleeding was the initial symptom. Death may result either by drowning in aspirated blood or actually by exsanguination. The authors encountered 12 such patients during the last 5 years on the Surgical Service of the State University of Iowa Hospitals. Thoracotomy and pulmonary resections were performed to stop the bleeding from the pulmonary tract. Active pulmonary tuberculosis or pulmonary neoplasms were not etiological factors in this group. Frequently, the erroneous diagnosis of a pulmonary neoplasm had been made prior to surgical exploration in spite of the knowledge that hemoptysis in patients with a bronchogenic carcinoma is usually a late symptom. The authors did not include patients with generalized disease which might cause bleeding; neither did they include patients with primary cardiovascular diseases of congenital or acquired nature. The most frequent causes for hemoptysis are quoted to be: bronchiectasis, pulmonary abscesses, and pulmonary tuberculosis. Acquired cardiac disease, as for instance mitral stenosis, may be the cause of hemoptysis of moderate degree, while congenital cardiovascular lesions very rarely produce pulmonary bleeding.

All patients were considered to be in good health prior to the onset of the severe hemoptysis, with the exception of one. As has been mentioned by various authors, the degree of hemoptysis bears no relationship to the gravity of the underlying pulmonary disease. In each instance, the underlying primary cause, itself, was not a threat to life except for the production of the massive bleeding. This can be illustrated by the pathologic findings in this group of patients. Bronchiectasis of mild degree was demonstrated in 2 patients, broncholithiasis, or calcified peribronchial lymph nodes in 6 other patients. No specific cause for the massive bleeding could be found in the remaining 4 cases.

The main preoperative problem is the exact localization of the site of hemorrhage. Occasionally, patients will be able to state from which lung they believe the bleeding arises. This was the case in one-half of the patients in this series. A vague sensation of discomfort or pain may be present. Splinting of the involved side may be noted. Physical findings may be helpful but are also misleading due to the involvement of other portions of the lungs by aspirated blood. Roentgenograms of the chest frequently will help in localization of the lung which is the source of the hemorrhage, but may be misleading in the localization by lobes or pulmonary segments. The visualization of calcific peribronchial nodes in the chest roentgenogram appeared to the authors to be very significant.



Planograms and roentgenograms in different positions of rotation are helpful in the demonstration of the anatomical relationship of the calcific masses or peribronchial nodes to the bronchial tree. Bronchography may at times be valuable but usually is of limited usefulness during the active phase of bleeding. It is not only difficult but also may be misleading due to the blockage of different portions of the tracheobronchial tree by aspirated blood. Demonstration of bronchiectatic changes by Lipiodol instillation during quiescent periods is of the greatest importance.

In the opinion of the authors, the most valuable procedure which must be carried out in all patients with hemoptysis, is bronchoscopy. This investigation must be done during the time of active bleeding. The source of bleeding may not be visualized directly but, at least, it will be possible to determine the lobar, or occasionally, the segmental bronchus from which the blood is coming. This procedure must be done with the greatest care. Removal by suction of all endobronchial clots is essential. The visualization of fresh blood coming from a bronchial orifice under these circumstances can then be taken as certain and the proper localization of the source of hemorrhage. Facilities for immediate thoracotomy should be available at that time. Reactivation of severe bleeding has occurred in some patients in this series necessitating emergency pulmonary resection as a lifesaving procedure. A delay in carrying out bronchoscopy until bleeding has stopped may not be possible and is also undesirable. The opportunity to localize the site of hemorrhage may have passed by that time.

The authors believe that an episode of massive hemoptysis is a definite indication for exploratory thoracotomy. As soon as all possible and indicated diagnostic procedures have been completed in an attempt to localize the site of hemorrhage, surgical exploration should be performed. Lobar, and if possible, segmental localization is certainly desirable but exploration should not be withheld if the side from which the bleeding arises has been demonstrated. Prolonged observation, with the hope that a massive hemoptysis may stop, usually leads to further difficulties. Frequently, the patients may show some reduction of the amount of hemorrhage, only to resume severe bleeding at unexpected moments. Invariably, the patients develop extensive aspiration pneumonitis, atelectasis, and later, pulmonary infections. This may happen in spite of all efforts to prevent aspiration into the opposite bronchial tree and even with the best possible measures to protect the noninvolved pulmonary tissue. Reduction of functioning lung tissue further decreases the patient's chances for survival during, or recovery after, surgical intervention.

Protection of the contralateral bronchial tree from aspiration of blood is most important. Positioning the patient to promote adequate drainage may be of value. Mild sedation to promote rest but not enough to reduce the cough reflex is advisable. Other forms of conservative treatment, in



an attempt to reduce the pulmonary bleeding are, in the opinion of the authors, not indicated in this group of patients. Temporary or permanent collapse procedures of one type or another may be of value in patients with pulmonary tuberculosis in whom immediate resection is not advisable.

The problem of the management of massive life-threatening hemoptysis due to nonmalignant and nontuberculous disease is presented. The authors believe that massive hemoptysis constitutes an indication for thoracotomy as soon as localization of the bleeding site has been established. Preoperative diagnostic procedures for localization of the site of hemorrhage are described. Bronchoscopy during an episode of bleeding is essential. Information gained by this investigation will guide the rational surgical management to a great extent and prevent unnecessary sacrifice of pulmonary tissue, inasmuch as operative findings in themselves are often misleading. Broncholithiasis or calcific peribronchial lymph nodes were found to be frequent causes of massive pulmonary bleeding. Resection therapy in the treatment of these patients has resulted in a low morbidity rate and no mortality. (Ehrenhaft, J. L., Taber, R. E., Management of Massive Hemoptysis, not Due to Pulmonary Tuberculosis or Neoplasm: J. Thoracic Surg., 30: 275-283, September 1955)

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#### Treatment of Preeclampsia and Eclampsia

The best criterion for successful management of eclampsia is the use of a regimen of therapy with which the physician is thoroughly familiar. His armamentarium should include experience, knowledge of what a given form of treatment should do, and a constant awareness of the complications which frequently accompany eclampsia. He should always have a definite plan in mind, and if improvement is not apparent in a given period of time he should plan to interrupt the pregnancy at the safest possible moment.

The incidence of nonconvulsive toxemia varies in large clinics from 5 to 10%. About 1 of every 10 of these patients suffers from severe toxemia; these are the cases to be "weeded out" in early pregnancy.

When a patient is seen early in pregnancy and has had toxemia in a previous pregnancy, a history of hypertension, or of acute or chronic kidney disease, or when signs of any of these conditions appear early in pregnancy, she should have a thorough work-up, preferably in the hospital. Studies should include: (1) examination of urine with Addis count; (2) urea clearance test or determination of the concentrating ability of the kidney; (3) determination of the amount of protein excreted in the urine per 24 hours; (4) ophthalmoscopic examination; and (5) frequent determinations of blood pressure.

In general, one may advise the patient that the pregnancy may continue if: (1) ophthalmoscopic examination does not disclose extensive retinal changes; (2) blood-urea clearance is 50% of normal or higher; (3) concentrating ability of the kidney is 1.020 or more; (4) Addis count is not too abnormal; (5) excretion of protein in a 24-hour period is less than 0.3 gm.; and (6) blood pressure is not consistently higher than 170 mm. Hg systolic.

The patient and her husband may desire to continue the pregnancy even though the results of these studies are not favorable. One should advise them of the dangers to the mother and of the probability that there is only about one chance in three that they will leave the hospital with a live baby. A note should be placed in the records as to the physician's advice and the couple's decision.

The first abnormal finding in almost all cases of true preeclampsia is an abnormal gain in weight early in pregnancy. The pregnant patient's weight gain should be limited to 7 or 8 kg. above the ideal for her height and age. A weekly gain of 600 gm. or more is definitely abnormal and indicates excessive retention of sodium and water. The physician should watch constantly for abnormal gains in weight, increase in blood pressure to 140/95 or more, or a systolic increase of 30 mm. Hg or more, development of pretibial edema, a trace of 1 plus or more of proteinuria, or other abnormal findings. If any of these occur, one must observe the patient more closely, and if the symptoms or signs are of an alarming nature or if they appear abruptly, the patient may require hospitalization. It is best to err on the side of overestimating the severity of symptoms. This applies to the management of all cases of toxemia of pregnancy, even when a physician has had years of experience.

One should never prescribe sedation for a patient with preeclampsia who is being managed on an outpatient basis. Such sedation may mask important symptoms. The patient is instructed to call her physician immediately if any symptoms of the condition develop.

If the condition is not stabilized with the outpatient regimen, the patient is hospitalized and observation and treatment of nonconvulsive toxemia are begun.

The aim of treatment is to carry the pregnancy to at least 32 weeks. However, if any of the following symptoms or signs persist or increase despite active therapy, the pregnancy should be terminated.

- 1 Consistent systolic blood pressure of 170 mm. Hg or a persistent daily increase
- 2 Proteinuria of 5 gm. or more in 24 hours, or a large amount as indicated by the qualitative test
- 3 Weight gain exceeding 100 gm. per day while the patient is adhering to a strict low sodium, low potassium diet.



- 4 Marked edema, occurring suddenly
- 5 Cerebral, visual, or gastrointestinal symptoms
- 6 Oliguria, anuria, or hematuria
- 7 Jaundice
- 8 Blood nonprotein nitrogen of 50 gm. percent or more
- 9 Pulse rate of 120 or more
- 10 Edema of the lungs or cyanosis
- 11 Concentration of blood as indicated by an abnormally high or increasing hemoglobin, cell volume, serum protein concentration or specific gravity

The initial period of observation and treatment of the hospitalized patient, therefore, is for the purposes of evaluating the severity of the condition, trying to establish a definite diagnosis, and instituting a regimen to control the abnormal signs and symptoms.

The aim of treatment of nonconvulsive toxemia is the prevention of convulsions. The maternal mortality rate for nonconvulsive toxemia, as reported from seven maternity hospitals, has been 0.082%, but 8% of the mothers die when convulsions occur.

The accepted method of treating eclampsia consists of medical management for 6 or more hours and delivery as soon as it can be accomplished safely with the lowest possible maternal mortality. When convulsions have been controlled, the patient has been brought out of coma, and a good urinary volume has been established, one may wait for the onset of labor for a maximum of 4 or 5 days if the patient has mild eclampsia.

If a patient presents one or more of the following findings, the authors consider her to have severe eclampsia.

- 1 Coma
- 2 Temperature of 39° C. or more
- 3 Pulse rate over 120
- 4 Respiratory rate over 40
- 5 More than 10 convulsions
- 6 Cardiovascular impairment (edema of the lungs, persistent cyanosis, low or falling blood pressure, low pulse pressure, et cetera)
- 7 Failure of treatment to stop the convulsions or prevent their recurrence; to produce a blood dilution as indicated by a decrease of at least 10% in the hemoglobin, cell volume or serum protein concentration, or to produce a urinary output of at least 700 cc. per 24 hours

With these criteria and the knowledge of what this type of treatment should accomplish, one frequently can classify the type of case on admission

or within 6 to 7 hours. If the case is severe, arrangements are made after 8 to 12 hours of medical management to terminate pregnancy by the safest method. (O'Keefe, C.D., O'Keefe, J.K., Treatment of Preeclampsia and Eclampsia: Postgrad. Med., 18: 165-173, September 1955)

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### Prevention of Acute Nephritis

Both acute rheumatic fever and acute glomerulonephritis are complications of group A streptococcal respiratory infections. Although significant advances have been made during the past decade in the prevention of attacks of rheumatic fever, little attention has been paid to the problem of preventive measures for acute nephritis. This is especially surprising because both diseases are caused by group A streptococci, and the therapy of both the renal and cardiac complications can be considered inadequate today. In this present report, the natural history of acute glomerulonephritis is emphasized in an attempt to focus medical attention on those features of the disease which may be susceptible to vigorous preventive measures.

The control of rheumatic fever is based on the fact that the disease is caused by an infection with group A streptococci. By the judicious use of antibiotics, it is possible to control both initial and recurrent attacks of acute rheumatic fever. Theoretically, similar methods should be equally effective in the prevention of acute nephritis, but because of certain fundamental differences between the two complications, it is necessary to alter the preventive program.

In the general population, the only practical method presently available for the prevention of rheumatic fever is the treatment of the preceding streptococcal infection. To be effective, such therapy must eliminate the infecting organisms from the host. Chemotherapeutic agents administered in inadequate amounts fail to eradicate the streptococcus and do not alter the attack rate of acute rheumatic fever. The drug of choice appears to be benzathine penicillin, administered as a single injection of 600,000 to 900,000 units. Although early therapy of such infections is advisable, treatment instituted as late as the ninth day after the onset of the sore throat will still prevent rheumatic fever in the majority of patients.

The problem of preventing initial attacks of acute nephritis in the general population appears somewhat more difficult than the prevention of rheumatic fever.

The failure to prevent renal damage in every patient receiving penicillin may be due to the short latent period exhibited by many patients developing nephritis. Thus, the glomerulus may be damaged early in the streptococcal disease, as evidenced by the hematuria occurring during the



first few days of infection. Under such circumstances, perhaps a modification of the nephritic complication is the most one could expect from such treatment. In rheumatic fever, the evidence indicates that the rheumatic process is initiated late, usually after overt signs of the streptococcal infection have subsided. From a practical standpoint, these observations emphasize the importance of early treatment of the streptococcal respiratory disease and indicate the need for the development of other preventive measures.

Following infection with most nephritogenic types of group A streptococci, the attack rate of acute nephritis is considerably higher than the attack rate of rheumatic fever. Furthermore, many inapparent examples of acute nephritis develop following infection with these organisms.

All individuals coming into intimate contact with the patient with nephritis should be cultured, and those shown to harbor beta hemolytic streptococci should receive an injection of 600,000 units of benzathine penicillin. By these measures, the organisms can be limited in spread within the family or other population groups. Only by such methods, can the incidence of nephritis be reduced appreciably. To recommend that acute nephritis be made a reportable disease so that the public health authorities may assist in the development of effective control measures, would appear entirely reasonable.

It is now well established that patients who have had an attack of rheumatic fever are especially susceptible to recurrent attacks. From 20 to 80% of rheumatic patients, experiencing a streptococcal infection, will develop a new attack of rheumatic fever. For this reason, continuous prophylaxis is recommended for all individuals who have experienced an overt rheumatic episode.

The situation is somewhat different in the case of nephritis. Patients, who have chronic nephritis frequently develop an acute exacerbation of the disease following a variety of infections. Characteristically, these episodes develop soon after the onset of the acute illness and no latent period is discernible. The urine specimens from these patients usually contain large amounts of albumin as well as numerous red cells and casts. In such patients, the acute exacerbation may precipitate an episode of renal failure. It is, therefore, advisable to place all patients with signs of chronic nephritis on a prophylactic regimen. For this purpose, oral penicillin may be administered in doses of 250,000 units once or twice daily or, as an alternative, a single intramuscular injection of 600,000 to 900,000 units of benzathine penicillin may be given at monthly intervals.

Patients, who have developed acute glomerulonephritis following a streptococcal infection, usually recover completely and fail to show an increased susceptibility to recurrent attacks.

Emphasis should be given to the need for further knowledge of the immune status of the patient who has had acute nephritis. This is especially

true today when the majority of patients with acute nephritis receive penicillin. Such therapy may inhibit type-specific antibody formation, even though it is usually administered 10 days after the onset of the streptococcal infection. It is possible that a few of these patients will develop a second infection due to one of the nephritogenic streptococci, and that second attacks of nephritis will be observed. To date, no such instance has been described.

By the intelligent use of penicillin in the therapy of streptococcal infections, the incidence of nephritis should decrease. Of special importance, is the recognition of the public health aspects of nephritis, because the physician has the opportunity to limit the spread of nephritogenic organisms by the proper prophylactic procedures. (Rammelkamp, C.H., Jr., Prevention of Acute Nephritis: Ann. Int. Med., 43: 511-517, September 1955)

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#### Residual Motor-Skeletal Disabilities Among 215 Motorists

Links in the life history of motorists, involved in accidents, comprise five groups: those who escape injury, immediate deaths, intermediate deaths (within 48 hours), delayed deaths, and survivors after injury. Each group has its own set of clinical and epidemiological implications. The present series is intended to supplement the fifth group - bridging the gap between the hospital discharge and subsequent periods in the clinical life history of automotive crash victims. These people were seen by the author in his office from late 1949 through July 1955, as new and ambulatory patients, in periods after their accidents which ranged between several months and several years. The universality of mechanically produced disabilities makes these kin to industrial injuries.

Crash forces responsible for injuries to vehicular occupants derive from vehicular masses, speeds, and the nature of their principal impacts. It is noted that 70% of the vehicles were passenger cars and 30% were commercial carriers of one kind or another. About 25% of the accidents did not involve crashes between vehicles.

The incidence and frequency rates of involvement of the various bodily areas in this series of patients are illustrated. The neck, low back, and lower extremities were about equally affected, the remainder being distributed among upper extremities and miscellaneous regions of the body. About 85% of the lesions involved the cervical, low back, and lower extremity regions.

Complicating arthritis, as well as the original forces, seem to have been responsible for the prolonged periods of disability experienced by



many of these patients. Undoubtedly, these people had a lowered tolerance to the forces they encountered at the time of the accident. Questions occurred with regard to aggravation of pre-existent arthritis and to preventive measures.

There were 600 sprains of the low back region. Thirteen percent affected persons up to 20 years; 70%, those between 20 and 45 years; 17%, those between 45 and 65 years; and none thereafter. From the standpoint of seating, 62% were drivers, 28% were front seat passengers, and 10% were back seat passengers. The types of impacts were similar to those which produced neck injuries.

Of interest, was the observation that the low back situation is at the opposite extreme of the spinal column from the very mobile cervical portion. Whiplash is not possible in the lower, more massive part of the body from the sitting position in the true sense of the phrase. This portion of the body is the one most easily amenable to restraint by safety gear (belts, et cetera). Properly seated, the lower back is said to be in the most relaxed and least vulnerable position to injury. Perhaps more attention to automotive seating (proper design) will reduce the number of these low back complaints. The same may be said of safety belts. However, there are those who fear that the latter would increase whiplash effects upon the cervical region. Low-back disabilities offer another category among motorist casualty disabilities which are often lost sight of at the time of the accident and immediately afterward.

Among those with injuries of the upper extremities, 50% sat in the right front seat (the only category where drivers were not predominant), 31% were drivers, and 19% sat in the back seat. Fifty percent of these lesions involved the shoulder joint; the remainder were distributed equally among elbow, wrist, forearm, and hand. Approximately two-thirds affected the soft parts: bursae, muscles, tendons, and joint capsules. Pre-impact positions determined in part the vulnerability and degree of injury sustained by most of these persons. By the same token, the difficulties with regard to factors of safety relative to these mobile and relatively small bodily masses become apparent and ought to be appreciated by the more unreasonable critics of the automotive industry.

All areas of the lower extremities were involved. Fifty percent were drivers, 33% front seat passengers, and 17% were back seat passengers. Twenty cases with internal derangement of the knee were of special interest: 12 meniscal (two lateral); six ligamentous (one cruciate); and one loose body and chondromalacia of the patella. Only one of these cases was complicated by arthritis. Eighteen were noted among younger age groups; also one each in the seventh and eighth decades. The remainder of the lesions affecting the lower extremities were of the run-of-the-mill variety: soft, skeletal, and joint.

These peripheral lesions (lower extremity) implicate various interior design factors (impact areas) almost to the same degree that head, face, and chest injuries (acute) do - namely dash, steering column, floor pedals, et cetera. Thus, knees impacted dashes, steering columns, and wheels; feet entangled foot controls and sometimes were caught in partially opened doors (recurrent specter of ejection), under floor mats, under the back of the front seat; and occasionally, legs were smashed because they were crossed at the time of impact.

From the seated position, it would appear that bodily restraint by seat belt would help to nullify some of the impacts suffered by the lower extremities - especially the knee-dash ones many of which result in fractures of the patella, femur, and hip joint (fracture dislocations). The knee derangements suggest that some of the kinematics of the human body under crash conditions exert forces of leverage as well as direct pressure effects.

It is possible that seat belt restraint would minimize this tendency by preventing bodily dislocations in the first place. (Kulowski, J., Residual Motor-Skeletal Disabilities Among 215 Motorist Casualties: *Indust. Med.*, 24: 395-397, September 1955)

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#### Cutting Properties of Dental Burs

Research at the National Bureau of Standards dental research laboratory indicates that eccentricity of rotating burs causes vibration at frequencies distressing to dental patients. The investigators also found that high-speed rotations of true-running dental instruments produce vibrations above the frequencies causing the greatest distress, and that burs and diamond wheels cut more effectively at higher speeds.

Until a few years ago, little was known regarding the cutting action of dental burs on human teeth. Data on industrial cutters is not entirely applicable to dental instruments because the properties of tooth enamel and dentin differ from other materials and because dental instruments are so much smaller than industrial cutters. Besides, the problem is complicated by the subjective element introduced by the patient. The primary aim of the NBS work in this field has been to discover how the rotating dental instrument may be most effectively operated without injuring vital structures through high temperatures or vibration and with minimum discomfort to the patient. A second aim has been to gather data for use by the Armed Services in specifying standards for procurement of rotating dental instruments.

Previous work has shown that vibrations applied to teeth in the frequency range between 100 and 300 cycles per second produce the most



unfavorable patient response. Unfortunately, frequencies in the range 100 to 200 cps are dominant in eccentric burs rotated at 6000 to 10,000 rpm - speeds now used by many practitioners. The NBS investigation attempted to find out what degrees of bur eccentricity at what speeds cause vibrations in the distressing range.

In order to do this, a number of steel and carbide burs and diamond abrasive wheels from various suppliers were studied. It was found that a true-running eight-bladed bur rotating at 10,000 rpm produced eight low-amplitude peaks per revolution at a frequency of 1330 cps. However, a similar but eccentric bur rotating at the same speed produces a fundamental frequency of 166 cps with amplitude proportional to the amount of eccentricity.

The data regarding vibration will be applied to clinical practice as rotating instruments are improved. If eccentricity of dental burs is kept small and symmetry of cutting heads increased, the chatter and vibration in the range of frequencies most annoying to patients can be reduced. However, even the most accurate bur will not perform properly in a hand-piece that does not operate smoothly. Therefore, the Bureau plans to study the effect of the handpiece on vibration in the near future.

In the course of the study on rotating dental instruments, the relative cutting ability of steel and carbide burs and of diamond abrasive wheels was compared. The results showed that diamond instruments cut tooth enamel more rapidly at speeds of 10,000 rpm than 5000 rpm. Diamond wheels are many times more efficient than either steel or carbide when cutting tooth enamel. The cutting rates of both steel and carbide burs are similarly improved at the higher speed when cutting dentin. Carbide burs cut dentin at about twice the rate of steel burs at 10,000 rpm. In general, high speed rotation enables dental instruments to cut teeth faster with less pressure and with lessened probability of damage to tooth structure when proper cooling is employed. Many dentists also feel that better control of the instrument results when high rotating speeds are used. (National Bureau of Standards, September 1955; D. C. Hudson, J. L. Hartley, R. Moore, W. T. Sweeney)

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#### Change of Address

Please forward requests for change of address for the News Letter to: Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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From the Note Book

- 1 Rear Admiral B. W. Hogan, MC USN, Surgeon General of the Navy, will attend the 66th Annual Meeting of the Association of American Medical Colleges, October 24 - 26, 1955. Admiral Hogan will also attend the meeting of the Executive Council of the Association on October 22, at which time he will address the Council on "The Navy Medical Department." He will meet with the Council, the members of the Committee on Planning for National Emergency, and with the members of the Joint Committee on Medical Education in Time of National Emergency. (TIO, BuMed)
  
- 2 Rear Admiral H. Lamont Pugh, MC USN, relieved Rear Admiral Leslie O. Stone, MC USN, as Commanding Officer of the National Naval Medical Center, Bethesda, Md., on September 30, 1955. (TIO, BuMed)
  
- 3 Commander P. C. Wilson, MSC USN, Executive Assistant to the Directorate for the Armed Services Medical Procurement Agency, recently received a citation from the Commission on Organization of the Executive Branch of the Government, signed by its Chairman, Herbert Hoover. The citation expressed the sincere appreciation of the Commissioners for the notable contribution which Commander Wilson made to their joint work on the Commission. (TIO, BuMed)
  
- 4 Commander R. B. Williams, Jr., MC USN, presented a lecture entitled, "Mechanisms Involved in Ionizing Radiation Injury and Radiotherapy," at a joint meeting of the Forsyth and Guilford Medical Societies, and to the students of the Bowman Gray School of Medicine in Winston Salem, N. C., October, 11, 1955. Commander Williams is the Head of the Pathology Division of the Naval Medical Research Institute, NNMC, Bethesda, Md. (TIO, BuMed)
  
- 5 Lieutenant R. Gorlin, MC USNR, will deliver a professional paper and participate in a panel discussion at the 28th Annual Scientific Sessions of the American Heart Association in New Orleans, October 22 - 24, 1955. The paper is entitled, "A Simple Clinical Test for Detection of Altered Cardiodynamics of Left Ventricular Failure and Mitral Stenosis." The panel discussion is entitled, "Hemodynamics in Relation to Heart Surgery." LT Gorlin is the Medical Officer in Charge of the Cardiopulmonary Function Laboratory, Naval Hospital, Portsmouth, Va. (TIO, BuMed)
  
- 6 October Historical Calendar. October 1, 1850, S. R. Addison appointed Assistant Chief of the Bureau of Medicine and Surgery . . . October 1, 1897, Newton L. Bates appointed 15th Chief of Bureau of Medicine and Surgery . . . October 1, 1943, former Naval Hospital, Shoemaker, Calif., commissioned . . . October 2, 1944, former Naval Convalescent Hospital, Banning, Calif.,



commissioned . . . October 9, 1873, U.S. Naval Institute founded . . .  
October 10, 1845, U.S. Naval Academy opened . . . October 12, 1911,  
Naval Hospital, Great Lakes, commissioned . . . October 15, 1948,  
first woman doctor commissioned in Regular Navy, Commander Francis  
L. Willoughby . . . October 17, 1944, former Naval Hospital, Astoria,  
Oregon, commissioned . . . October 18, 1867, Alaska purchased . . .  
October 19, 1942, Naval Hospital, Key West, Florida commissioned . . .  
October 20, 1954, first Medical Service Corps officer, Captain Fay O.  
Huntsinger, selected for promotion to grade of Captain . . . October 28,  
1878, J. Winthrop Taylor, appointed 10th Chief of Bureau of Medicine and  
Surgery. (TIO, BuMed)

7 AlNav 73 emphasizes the importance of annual physical examinations as a means for detecting disease processes in their incipiency and thus permitting early institution of corrective measures. Maximum benefits from such examinations require scrupulous care in conducting the examination, the exercise of sound clinical judgment in interpreting results, accurate reporting of results, and cooperation of officers examined with respect to recommendations for additional study or treatment.

8 The Public Health Service has announced ten grants totaling \$295,367 to start a special program of research into air pollution problems. The ten grants were awarded by the Surgeon General on recommendations of the National Advisory Health Council from a \$500,000 fund appropriated this year by Congress to the Department of Health, Education, and Welfare. (P. H. S., Dept. H. E. W.)

9 A course in Forensic Pathology will be given November 14 - 18, 1955, at the Armed Forces Institute of Pathology. The course is designed to familiarize pathologists with the problems of Legal Medicine and the role of the pathologist in the solution of such problems. The course is open to pathologists of the Armed Forces, Federal agencies, and civilians. Applications by civilian pathologists to attend this course in Forensic Pathology should be forwarded to the Director, Armed Forces Institute of Pathology, Washington 25, D. C. Pathologists in the military and other government services should apply via the appropriate channels of their respective service. (Armed Forces Institute of Pathology)

10 Pleurobiliary and bronchobiliary fistulas are caused by penetrating abdominothoracic wounds, obstruction of the biliary ducts in conjunction with calculus, secondary infection, or strictures due to surgical injury. The acute phase must be treated promptly by adequate drainage to correct the intrathoracic dynamics (or in case of bronchobiliary fistula) to prevent a serious necrotizing bronchitis and pneumonia. Secondary operation on the biliary tract and even pulmonary resection may be necessary to cure these serious and unusual conditions. (J. Thoracic Surg., Sept. 1955; H. D. Adams, M. D.)

BUMED INSTRUCTION 6710.20

3 October 1955

From: Chief, Bureau of Medicine and Surgery

To: All Ships and Stations

Subj: Defective medical and dental material; authority for disposition of

Ref: (a) Medical and Dental Materiel Bulletin, Edition No. 58  
of 1 Sep 1955

(b) Art. 25-21, ManMedDept

This instruction provides authority for the disposal of defective material listed in paragraph IV of reference (a), and such additional material as noted.

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BUMED INSTRUCTION 11110.1

3 October 1955

From: Chief, Bureau of Medicine and Surgery

To: Stations Having Medical/Dental Personnel Regularly Assigned

Subj: Fixed medical treatment facilities; classification, nomenclature, definition, and redesignation of

This instruction promulgates classification, nomenclature, and definitions applicable to fixed medical treatment facilities revised in accordance with current instructions of the Department of Defense, and to redesignate existing medical facilities of the Navy Department in conformity therewith.

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BUMED NOTICE 6230

7 October 1955

From: Chief, Bureau of Medicine and Surgery

To: All Ships and Stations Having Medical Department Personnel  
Regularly Assigned

Subj: Influenza vaccine; use of

This Notice provides information concerning utilization of influenza vaccine by military activities during winter of 1955 - 1956.

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## MEDICAL RESERVE SECTION

### Seminar for Commanding Officers of Reserve Medical and Dental Companies

A seminar for commanding officers of nonpay medical and dental companies is scheduled to convene at the Bureau of Medicine and Surgery on Monday, 31 October 1955, and will continue through Saturday, 5 November 1955.

The seminar is planned to provide indoctrination and orientation of the Naval Reserve Program from Bureau level with particular emphasis on the medical components. Field trips to the National Naval Medical Center, the Potomac River Naval Command, and the Armed Forces Institute of Pathology will be conducted. A series of conferences will be held between those in attendance and the officers in the Bureau with a view for an improved Reserve Program through the exchange of ideas and recommendations.

The commandants of all continental naval districts and the Potomac River Naval Command have been assigned a quota for this seminar.

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### On-the-Job Training in Submarine Medicine

A 14-day, active duty training course in Submarine Medicine is scheduled to convene at the U. S. Naval Medical Research Laboratory, Naval Submarine Base, New London, Conn., on Monday, 7 November 1955.

This course of on-the-job training presents an up-to-date review of problems relating to Submarine Medicine and includes recent developments in Submarine Research. Quotas for this course have been assigned to Commandants of the First, Third, and Ninth Naval Districts. All Naval Reserve Medical and Medical Service Corps officers are eligible to attend.

Ten days' advance notice to the Commanding Officer, Submarine Base, and the Officer in Charge, Medical Research Laboratory, New London, Conn., is required so that accommodations may be made available. Quarters, messing and off-duty recreation facilities are available on the base. Off-station accommodations are limited. Orders should direct the trainee to report prior to 1600 on the date preceding the convening of the course. Secret clearance is required.

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Gratuitous Points

Did you know that your 15 "gratuitous points" are prorated according to the amount of active duty or active duty for training you perform, in computing each year of satisfactory Federal service for retirement purposes?

If you take the normal tour of 14 days' ACDUTRA, you lose one gratuitous point. Reservists who operate on a slim margin of safety - that is, those who try to hit the 50-retirement-points-each-year requirement right "on the nose" - should consider this technicality when planning their satisfactory year of Federal service.

A recent decision by the Comptroller General provides that "in each year of Federal service after 30 June 1949, there be deducted the number of days of active Federal service in order to determine what portion of the 15 days (gratuitous points) may be credited in such year for service in an active Reserve component." Active Federal service has been defined for this purpose as active duty and active duty for training.

The following table shows the number of gratuitous points which may be awarded, based on the Reservist's periods of active duty or ACDUTRA:

<u>Days Active Duty</u> or <u>ACDUTRA</u>	<u>Gratuitous Points</u> to be <u>Awarded</u>
0 - 12 .....	15
13 - 36 .....	14
37 - 60 .....	13
61 - 85 .....	12
86 - 109 .....	11
110 - 133 .....	10
134 - 158 .....	9
159 - 182 .....	8
183 - 206 .....	7
207 - 231 .....	6
232 - 255 .....	5
256 - 279 .....	4
280 - 304 .....	3
305 - 328 .....	2
329 - 352 .....	1
353 - 365 (366) .....	0

(The Naval Reservist, August 1955)

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AVIATION MEDICINE SECTIONCourse in Aviation Medicine

The Bureau of Medicine and Surgery announces that a class in Aviation Medicine will convene at the U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla., on 2 April 1956. The course consists of approximately 6 months of academic instruction in aviation medicine and flight indoctrination training, and leads to the designation of successful candidates as U. S. Naval Flight Surgeons.

The class will be limited to 30 students and is open to medical officers of the Regular Navy and Naval Reserve in the ranks of Lieutenant Commander or below.

Medical officers who wish to apply for the Course in Aviation Medicine should do so by an official request via the chain of command to the Chief of the Bureau of Medicine and Surgery which shall contain this service agreement: "If this request is approved, I agree to remain on active duty for one (1) year upon completion of the Course in Aviation Medicine, or for six (6) months beyond my currently obligated service, whichever is longer." (AvMedDiv, BuMed)

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The Air Development Squadron

Many flight surgeons have shown interest in some new developments of Naval Aviation and found information difficult to gain. The Navy's air development squadrons (of which there are 6) serve as a test bed and evaluation team for new aircraft, equipment, and tactical procedures. Since I have been attached to Air Development Squadron 3 (VX-3) for the past 18 months and have been privileged to participate in much of the flight evaluation, it was requested that I take this opportunity to pass on to other flight surgeons information concerning the projects this Squadron has been conducting.

First, in order to make the conclusions of a project valid for present and near-future air groups, all types of aircraft must be included. In VX-3,

the stress is on jet fighters; and thus, the F9F-8, F2H-3, F2H-4, FJ3, and F7U-3 are flown, as well as the AD-5N and AD-6 in some special work.

The most recently completed project was a field and shipboard evaluation of the "mirror" or visual reference landing aid. This system of carrier landing for day and night operations has proved practical, and further intensive training and evaluation is now being carried out by fleet squadrons aboard the USS Bennington. The mirror is in fact, just that: a large but precisely made polished aluminum surface with dimensions of 4 feet by 5 feet, being vertically flat and horizontally concave. Next to the mirror laterally are two rows of "datum" lights. The mirror is mounted halfway along the port side of the ship's canted deck and rises approximately 8 feet above the landing surface, facing aft toward the groove. A source light is mounted 160 feet astern of it, about level with the landing area. By angling the mirror slightly upward, a visual glide path reflection of the source light, sloping 4 to 5 degrees relative to the deck is established. As long as a pilot flying down the groove keeps the source light centered on the mirror with reference to the datum lights, he will clear the ramp well and pick up number 3 wire every time. If he is high, the ball of light shows high and he can correct easily, the same being true for low indications. If the six wires are missed, the "go-around" is easily accomplished off the angled deck since engine power is never reduced unless the wire is caught. The approach is very comfortable, being about 200 feet higher than the standard pattern throughout and having a steady descending straightaway which allows excellent visibility: a "plan" view of the carrier deck. Wave-off is given by flashing red lights located along the side of the mirror. These are actuated by the Landing Safety Officer (Landing Signal Officer) who is not specially trained for the job, but need be only an experienced carrier aviator. All pilots have agreed that this landing system coupled with the canted deck is far superior to present methods of carrier landing, and they are psychologically more confident when coming aboard. These two innovations were developed by the British Navy and have been used successfully by them.

A development in the field of navigation and instrument flight with which the squadron has worked is TACAN. In this system, a transceiving antenna, located ashore or afloat, emits signals which enable electronic "black boxes" in the aircraft to present to the pilot his azimuth (magnetic bearing) and distance from the station up to about 200 miles, line of sight at altitude. With these two bits of information, precise broadcast control fighter interception can be made; the accuracy being great enough to reliably bring an interceptor to within the short sighting range needed for visual contact of target aircraft at high altitudes and speeds. As an incidental point, this work has shown, however, that the human eye for sighting will



be inadequate under future combat conditions, and concentration of RADAR-like electronics aids will be essential. With TACAN equipment, jet fighters can rendezvous on course at cruising altitude after as much as one minute interval take-offs and penetration of IFR weather, a procedure which without the distance and bearing information in such an accurate form is almost impossible to accomplish. Also, a large number of aircraft can make safe, closely spaced penetrations of overcasts down to several hundred feet and land aboard ship or on the field in rapid succession, a most important consideration for gas-gulping turbo-jets. If this equipment proves out as satisfactorily as it now seems to be, the all-weather and tactical potential of our fleet aircraft will be greatly augmented.

In another VX-3 project, the probe and drouge method of refueling fighter aircraft was evaluated as to its effectiveness for range extension; and the problems of rendezvous with a tanker plane using present navigational aids were investigated.

As the flight surgeon, I have looked into these projects and others, seeking methods for improving pilot effectiveness, comfort, and safety. In a project concerning long range, low level navigation flights (100 feet over the terrain for up to 12 hours), methods for relieving pilot fatigue with special in-flight food, drugs, and seat pads were studied. My own muscular spasms and macerated buttocks after these flights attested to the acuteness of the problem. This experience is highly recommended to any flight surgeon who wishes to glean the wisdom of Aesculapius in dealing with pilots' "hypochondria." Dexedrine Spansules were found to be an efficient medication for combating fatigue and for best results, were taken about 5 to 6 hours before expected landing time. A special woven plastic seat, provided for evaluation by the Aeronautical Medical Equipment Laboratory (AMEL), proved a simple and practical aid for seating discomforts.

The pilots of VX-3 also have assisted AMEL in the evaluation of several new single-piece protective helmets (M. S. A., H-5, and B. B. C. types), eye shields and goggles, and winter and summer flight suits.

We have also had close liaison with the Aviation Medical Acceleration Laboratory at Johnsville, Pa., and are collecting for them three-dimensional, G timegraphs of our jet fighters in aerobatics and combat maneuvers, as well as steam and hydraulic catapult launches and carrier arrested landings. The actual G patterns, experienced by aviators of modern jet fighters, can thus now be accurately simulated on the centrifuge. (LT Frank H. Austin, Jr., MC USN, VX-3, NAS, Atlantic City, N. J.)

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**ATTENTION ALL FLIGHT SURGEONS!**  
**BE PREPARED FOR OPNAV INSTRUCTION 3740. 3A!**

Printing and distribution of the new OpNav Instruction 3740. 3A should be accomplished within a few weeks. Look for it. It contains the ground rules for implementing a strengthened Aviation Physiology Training Program. It is important to all flight surgeons, and you will want to brief your commanding officer and flight personnel on the differences between it and 3740. 3, the subject of which was Aviation Oxygen Training Qualifications.

The objective of this instruction is to train flying personnel so that they will be prepared in every respect to cope with the hazards of flight which they may encounter.

Flight surgeons recognize that a thorough knowledge of aviation physiology and proficiency in the use of personal protective equipment are prerequisites to safety of flight and the success of a military mission. This instruction strengthens your hand in the practice of your specialty. Like Captain A. G. Lamplugh (RAAF), you will say:

"Aviation is inherently safe, but, to an even greater extent than the sea, is terribly unforgiving of any incapacity, carelessness, or neglect."

Commanding officers look to the flight surgeon for assurance that flying personnel are fit and ready for the flying job at hand. In effect, the flight surgeon's task is to ferret out the incapacity, carelessness, or neglect among his fliers and do something about it. "3740. 3A" will assist you.

You, the flight surgeons of the Fleet, have written this instruction. How? Well, you began by submitting the Medical Officers Report of Aircraft Accidents. You reported that pilots were diving into the ground from 30,000 feet with no attempt at recovery. The cause? Probably some carelessness or neglect involving oxygen equipment or use. When was the victim's last low pressure chamber run? Could you assure the commanding officer that the pilot was thoroughly checked out in his oxygen gear?

You reported that pilots who had never been in an ejection seat trainer were trying to get out of a disabled jet. Hardly the time to learn how - those few available seconds in an emergency! Could you assure the commanding officer that the pilot knew his ejection seat mechanism as intimately as his shoestrings?

And, you reported many cases of vertigo, night blindness, and sensory illusions of flight which were the apparent causes of fatal accidents. The pilot who is unprepared to cope with these hazards is about as effective as a blind surgeon.



As a result of your reports, requirements for training in aviation physiology, oxygen breathing equipment, protective equipment, night vision, and use of the ejection seat have been written in some detail. Every flight surgeon should know the requirements by heart.

In addition, you will note that the flight surgeon is mentioned in the same phrase with the commanding officers: "Commanding officers and flight surgeons should recognize the continual nature of the training required by this Instruction . . ." Where the safety of flight is concerned, the flight surgeon is quarterback on the team. You can't play the game without the signals in 3740.3A.

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#### National Air Show Exhibit

The National Air Show, which was held at Philadelphia, Pa., on 3-4-5 September, included an aeromedical exhibit consisting of panel exhibits from the U.S. Naval School of Aviation Medicine, the Aviation Medical Acceleration Laboratory, the Aeronautical Medical Equipment Laboratory, and the Bureau of Medicine and Surgery. It is estimated that over 300,000 people visited this exhibit. Special interest was shown in the demonstration of the Navy's new full pressure suit and the ejection seat capsule.

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#### Examinations of Pilots Following Hospitalization

Numerous examples of failure of flight surgeons to submit proper posthospitalization flight physicals has come to the attention of BuMed. All pilots upon reporting for duty following a serious injury or illness and hospitalization will, prior to return to a flight duty status, be examined, and the original and one copy of the report of such examination shall be forwarded to the Bureau of Medicine and Surgery for approval.

(Flight surgeons are referred to the Manual of the Medical Department, Chapter 15-70, paragraph 2.)

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#### Respiratory Chemistry - Gaseous Exchange

To a visitor from outer space, the whole phenomenon of human respiration is utterly impossible on the face of it. Not a single cell on the

body surface (or even the cornea) is alive; hence, there is simply no way for the body to obtain from the surrounding atmosphere the 250 cc. of oxygen it needs each minute while at rest, to say nothing of 10 times as much during exertion.

For a one-celled creature, it is feasible; for an elaborate mammal, it is out of the question unless two peculiar devices are utilized. One of these, obviously, is the blood circulation; the other is a curious metal-containing, porphyrin compound that officiates in gaseous exchange everywhere on earth: It occurs with magnesium as chlorophyll in the vegetable kingdom, and with iron as cytochrome and hemoglobin in the larger self-propelled creatures.

### Efficiency

Man presents to the atmosphere a live area some 50 times as great as the body surface - up to 100 square meters - in the form of the pulmonary alveoli. They afford an admirable area for gaseous exchange in keeping with the remarkable chemistry of hemoglobin. However, the remainder of the respiratory system is lackadaisical in arrangement and nowhere approaches a striking level of efficiency. For instance, the movement of air in the human lung is tidal and all that this signifies in terms of dead space. The composition of the atmosphere is, itself, only passable, so that without artificial aids man is obliged to live within a few thousand feet of sea level.

But these deficiencies are largely overcome by the complex behavior of the hemoglobin molecule, which in a group of reciprocal reactions, takes up oxygen at its alveolar tension (100 mm. Hg), yields it at the lower oxygen pressure in tissues (1 to 60 mm. Hg) and counterbalances the chemical changes associated with movement of  $\text{CO}_2$  at either site. It is true that a little oxygen, 0.3 volumes per 100 cc., is carried in simple physical solution in the blood plasma, but some 20 volumes per 100 cc. is transported by red cell hemoglobin that leaves the lung at close to saturation (97.5%). When the arterial blood reaches the tissue capillaries, its oxygen tension is so much higher than that of its environs that the oxygen diffuses from the plasma across the capillary membranes, oxygen tension of the capillary plasma falls, and  $\text{O}_2$  is, therefore, released from the loose oxyhemoglobin combination. Thus, a steady flow of oxygen from red cell to tissue cell is impelled by the considerable gradient between them; in a sense, oxygen, like water, runs down hill.

### The S-Shaped Curve

The remarkable S-shaped oxygen-dissociation curve of blood (left) is such that the lower the oxygen tension in tissues, and the greater the need for oxygen, the more amenable is hemoglobin to yielding its store



of oxygen. Thus, with a tissue at rest and an oxygen tension of about 40 mm. Hg, some 5 volumes per 100 cc. of oxygen is given up by the hemoglobin. However, in severe oxygen depletion (as in muscular activity), when the oxygen tension of the tissue fluids and cells may be as low as 1 mm. Hg, the curve shows that hemoglobin can yield almost all of the 20 volumes per 100 cc. of the oxygen that it has stored.

The position of this curve, moreover, is influenced by pH; in a more acidic medium it shifts to the right, so that given a certain oxygen tension, more oxyhemoglobin becomes dissociated. Now, in the tissues where  $\text{CO}_2$  is being released, acidity increases, with the result that hemoglobin is exquisitely prone to deliver oxygen where it is needed.

The management of  $\text{CO}_2$  transport is likewise admirable. The  $\text{CO}_2$  that enters the blood from the tissues is most rapidly (and reversibly) converted into  $\text{H}_2\text{CO}_3$  by virtue of the enzyme carbonic anhydrase which is present in the red cells (not in the plasma). Thus,  $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3$ .

Only a relatively limited amount of  $\text{CO}_2$  could be transported in this fashion unless the partial pressure of  $\text{CO}_2$  were very high, and an intolerable acid pH developed. Fortunately, the buffer systems in the blood - primarily the blood proteins - are weaker acids than  $\text{H}_2\text{CO}_3$  and so preferentially yield their cations while binding hydrogen ions. The leading member of these buffer systems is hemoglobin itself, constituting about three-fourths of the total blood protein. What occurs can be summarized as:  $\text{H}_2\text{CO}_3 + \text{KHb} \rightleftharpoons \text{HHb} + \text{KHCO}_3$ , with the  $\text{KHCO}_3$  in the form of cation and anion,  $\text{K}^+$  and  $\text{HCO}_3^-$ . Thus, practically all of the carbonic acid ( $\text{H}_2\text{CO}_3$ ) forms bicarbonate so that the amount of  $\text{H}_2\text{CO}_3$  itself in the blood is very small.

A remarkable characteristic of hemoglobin is that its dissociability varies with oxygenation, oxyhemoglobin being more active or more dissociated, or a stronger acid, than reduced hemoglobin. Thus, when oxyhemoglobin becomes reduced hemoglobin in the tissues, it is even more avid to bind the hydrogen ion from  $\text{H}_2\text{CO}_3$  and make its potassium ion available for potassium bicarbonate. In the lungs, on the other hand, oxyhemoglobin is formed, and hydrogen ions are dissociated from it so that  $\text{H}^+ + \text{HCO}_3^- \rightarrow \text{H}_2\text{CO}_3 \rightarrow \text{H}_2\text{O} + \text{CO}_2$ , and the  $\text{CO}_2$  is driven from the blood.

Another important characteristic of hemoglobin is that it also directly combines with  $\text{CO}_2$  by means of one of its amine ( $\text{NH}_2$ ) groups, to form so-called carbhemoglobin. This reaction proceeds from  $\text{CO}_2$  itself without  $\text{H}_2\text{CO}_3$  as an intermediary. Reduced hemoglobin combines with  $\text{CO}_2$  much more avidly than oxyhemoglobin, so that here again is a reversible reaction calculated to take up  $\text{CO}_2$  from the tissues and release it in the lungs.

In addition to these mechanisms,  $\text{CO}_2$  is physically dissolved in blood plasma, but this simple solution accounts for only some 5% of  $\text{CO}_2$  carried in the blood.

These, in brief, are the chemical interrelations that make gaseous exchange possible. There are other wonderful facets.

### Other Controlling Factors

The central nervous system, in its normal control of respiration, is sensitive to, and operates primarily according to, the titer of CO<sub>2</sub> (the oxygen level comes into play as a controlling influence only in extreme respiratory disability). Another facet of the movement of CO<sub>2</sub> entails passage of HCO<sub>3</sub> — in and out of the red cell, which has a cell membrane permeable to it but not to corresponding amounts of cations; hence a movement of chloride ion in the reverse direction (chloride shift) occurs and serves to equalize the ionic balances.

Thus, if there is a single physiologic function that illustrates how ingeniously a living organism can survive and operate, using the subtleties of chemistry and physics, it is the system of gaseous exchange. (J. A. M. A., 159: 26-27, September 10, 1955) (Pfizer Spectrum)

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### Symposium on Physiologic and Pathologic Effects of Microwaves

A Symposium on the Physiologic and Pathologic Effects of Microwaves was held at the Mayo Clinic, Rochester, Minn., on 23 - 24 September. The purpose of this meeting was to bring together interested individuals from industry, medicine, research activities, and the military for discussions on the status of activities in this field and suggest further lines of future research. At the same time, it was hoped that some clarification would be made of the damage risk criteria in connection with exposure to this form of radiation.

From the military point of view, the presence of intense microwave radiation near the source of high powered airborne radars makes the exposure to these beams a potential hazard, and flight surgeons, attached to units possessing aircraft having radar equipment of high power, should be conversant with the safety factors involved. Attention is invited to the Bureau of Aeronautics CONFIDENTIAL Technical Note 17-54 and CONFIDENTIAL Technical Order 24-55.

A paper was presented at the Mayo Clinic Symposium by Commander Sidney I. Brody, MC USN, which outlined the interests of the military services in the biological effects of microwave radiation. Fundamentally, the major considerations in this regard center on safety precautions and methods to prevent accidental injury to personnel. LT T.S. Ely, MC USN, of the Naval Medical Research Institute, in a well received paper with co-author LTCDR David Goldman, MSC USN, discussed the result of investigations into the heating effects of microwaves on animals exposed to radar beams.

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The Symposium pointed out the need for further research into the action of microwaves of various frequencies on living tissue, and emphasized the requirement for the establishment of criteria concerning the field density of this nonionizing radiation for use in industry where exposures may be continuous, in medicine for use in conjunction with the operation of the microwave diathermy, and in the military where accidental exposures may be expected to be of short duration and of higher magnitude.

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Historical Facts of Interest for October

1 October

- 1955 The Navy announced the successful flight of the XP6M-1, the new 600 MPH jet seaplane called the "Martin Seamaster."
- 1946 The Navy plane "Truculent Turtle" set a record for nonstop long distance flight, completing an 11,236-mile trip from Perth, Australia, to Columbus, O., in 55 hours and 15 minutes.

2 October

- 1942 The first flight by turbojet aircraft in the United States was made at Muroc, Calif., by Bell P-59A with General Electric I-A engine.

3 October

- 1918 Flight refueling was demonstrated by LT Godfrey L. Cabot, USNR, who lifted 155 pounds of weights into his Burgess-Dunne seaplane from a moving sea sled. In a second flight exactly two years later Cabot picked up a 5-gallon can of gasoline from a float in the Potomac River near Washington, D. C.

5 October

- 1905 Orville Wright flew 24.2 miles in 38 minutes and 3 seconds at Dayton, O., establishing a world distance and duration record.

6 October

- 1923 LT A. J. Williams, USN, flying a Curtiss Racer at St. Louis,

set a new world speed record of 243.8 MPH for 100 kilometers, and 243.7 MPH for 200 kilometers over a closed circuit.

8 October

1912 The first Navy physical examination for pilots was published by the Bureau of Medicine and Surgery.

15 October

1924 ZR-3 (later renamed the "Los Angeles"), the first dirigible sent to the U. S. Navy from Germany under reparations agreement, arrived at Lakehurst, N. J.

19 October

1948 The Navy announced that photographs of the earth's surface had been taken from altitudes between 60 and 70 miles by cameras installed in rockets.

25 October

1911 LTS T. G. Ellyson and J. H. Towers USN established an unofficial nonstop seaplane record of 138.2 miles from Annapolis, Md., to Buckroe Beach, Va., in 2 hours and 27 minutes.

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